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AMSAT NEWS SERVICE
ANS-240

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat.org

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

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ANS-240 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2022 Aug 28

OMOTENASHI Project Shoots for the Moon This Week

OMOTENASHI, a project of the JAXA Ham Radio Club, is a CubeSat which will be launched by NASA SLS rocket, scheduled for August 29. It plans to land on the surface of the moon, and to transmit a beacon in the amateur 70cm band.

OMOTENASHI is one of the EM-1 CubeSat missions which will be launched by the NASA/SLS rocket (EM-1) together with the main mission of ORION experimental module on Monday. JAXA Ham Radio Club is going to utilize the flight demonstration opportunity of the OMOTENASHI mission to conduct the following amateur radio missions:
 (i) To conduct technological research with respect to receiving ultra-weak

UHF signal from a space probe toward the moon
 (ii) To conduct an outreach activity providing amateur radio operators all over the world with an opportunity to try to receive signals from moon region.

OMOTENASHI is a 6U-CubeSat with external dimensions of 239 x 366 x 113mm and an approximate mass of 14 kg.

OMOTENASHI consists of three modules: orbiting module, retro motor module, and surface probe. During the moon transfer orbit, these modules are integrated. When OMOTENASHI arrives at the moon, the surface probe will be separated and conduct semi-hard landing.

OMOTENASHI is actively controlled by ultra-small attitude control system including star tracker, sun sensor, IMU, reaction wheel, and cold gas jet thruster. During the moon transfer orbit, OMOTENASHI may be spin-stabilized due to the strict resources. For further details, please see: https://www.isas.jaxa.jp/home/omotenashi/JHRCweb/jhrc.html

There will be UHF CM/PSK/PM/PSK31 beacons, with 1 watt RF, on both the orbiting module and the surface probe. CisLunar explorer, MIT KitCube and Lunar IceCube are expected to share the same launch.

Orbiting Module DOWNLINK

    Frequency
        437.31 MHz
    Antenna
        SRR antenna
    Polarization
        Linear
    Modulation
        beacon, PSK31
    Sync Word
        C1 (ASCII code)
    Power
        30dBm

Surface Probe DOWNLINK

    Frequency
        437.41 MHz
    Antenna
        invert-F antennax4
    Polarization
        LHCP(, RHCP)
    Modulation
        FM, PSK31, PCM-PSK/PM
    Sync Word
        C1 (ASCII code)
    Power
        30dBm

Amateurs can constantly access the newest TLE from https://bit.ly/3wyopTr
 This file will be overwritten when we have calculated the next TLE during operation.

[ANS thanks JAXA Ham Radio Club for the above information]

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          Join the AMSAT President's Club today and help
                       Keep Amateur Radio in Space!
          https://www.amsat.org/join-the-amsat-presidents-club/
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These new GENESIS have a more powerful on-board computer than their predecessors and updated software that allows FM voice repeater functionality, AFSK/FSK non-regenerative repeater up to 2400 bps, FSK regenerative repeater up to 50 bps, CW, digitized voice pre-recorded FM and FSK telemetry at 50 bps. The correct retransmission of AX25 / APRS frames over FM up to 2400 bps has been verified in the laboratory.

A small drawback we still have is the antenna deployment mechanism, that is the first version that was made and requires a plenty charged battery. The satellites have been stored for several months, so it is a weak point. Hopefully it will work.

These satellites also have the names of ASTROLAND-1 and ASTROLAND-2 to say thanks to the sponsorship of the project by the Astroland Planetary Agency. We also thank the private companies and Universities that helped in the project.

As on the previous occasion, two experimental propellants are flown, although this time they are from the Madrid company IENAI Space and, unlike the previous GENESIS mission, they use a liquid ionic fuel. Only the one from GENESIS-J is functional. The one from GENESIS-G carries the electronics but without the fuel.

The frequencies coordinated with IARU are the following:

GENESIS-G/ASTROLAND-1
145.875 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK, AX.25, APRS 1200 / 2400 bps
436.888 MHz downlink, Modes: FM voice, CW, FSK 50 bps, FM voice beacon with AM2SAT callsign

GENESIS-J/ASTROLAND-2
145.925 MHz uplink, Modes: FM voice (no subtone) and FSK 50 bps, AFSK, AX.25, APRS 1200 / 2400 bps
436.666 MHz downlink, Modes: FM voice, CW FSK 50 bps, SSTV Robot 36, FM voice beacon with AM3SAT callsign

We encourage all to try to receive their first transmissions once the first keplerians are available.

This flight will be streamed by Everyday Astronaut:
https://everydayastronaut.com/

More information on the Firefly website:
https://firefly.com/alpha-flight-2-to-the-black/

[ANS thanks Felix Paez, EA4GQS of the AMSAT EA Team for the above information]

Limited-Time Opportunity - DX on AO27!

"On" times for AO-27 continue to shift along the direction of the orbit. The 5 min "on time" for ascending passes at mid-latitudes is now on DESCENDING passes. Based on current SATNOGS observations, from when the satellite is at about 75 degN to about 65 deg N. The descending node telemetry and repeater operation is probably only available to stations further and further south (a few lucky far-S America and maybe VK and ZL stations may soon be able work Antarctica if anyone is on!).

Northern Europe and the UK are now well in the footprint, NE Canadian provinces and some New England stations may be able to work Europe, and KL7 may be able to work northern Japan in a few weeks! These opportunities

won't last - the "on" time will continue to shift, and once the onboard clock is reset, the satellite will be back on a "normal" schedule.

If you hear or work AO-27, the command stations would appreciate knowing precise times for when the transmitter came on or turned off, and the reporting station's 6-character grid square or lat/lon. If you are in the far South and hear the 20 seconds of telemetry, try to capture KISS frames (NOT ASCII) and send the captured data file (or a good audio file we can try to decode). If scheduling SATNOGs observations (provides an excellent measure of on and off times), try to schedule descending passes during the "on" times and don't bother with ascending passes for now.

[ANS thanks Stephan Greene, KS1G, on behalf of the AO-27 command team for the above information]

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+ First, select an appropriate CubeSat form factor based on payload size, power requirements, and deployment mechanism.
+ Consider power budget (especially for when the spacecraft is “in eclipse” on the dark side of the Earth), acceleration and vibration tolerance (the sound of launch alone can damage the spacecraft), and thermal management (your satellite is effectively sitting in a rather large vacuum thermos).
+ Use Commercial Off-The-Shelf (COTS) parts with existing flight heritage wherever possible—see satsearch and CubeSatShop.
+ Pick solar panels, batteries, and an Electrical Power System (EPS) to manage them.
+ Include one or more antennas and radios to talk to a ground station or ground station network (or broadcast up to GlobalStar or Iridium instead).
+ If you need to maintain orientation, include an Attitude Determination and Control Systems (ADCS) which will use some combination of Earth, Sun, and star trackers, gyroscopes, GPS receivers, and magnetometers to sense orientation, and rotate the spacecraft using magnetorquers and reaction wheels. Some CubeSats also now use miniature thrusters for attitude control, desaturation, and orbit maintenance.
+ Deployable components, such as antennas and solar panels, are usually stored under tension and released with electromagnets or redundant burn wires.
+ Next, select an On-Board Computer (OBC) for Command & Data Handling (C&DH) and the flight software that will run on it, such as the open-source cFS and F´ frameworks from NASA.
+ Prior to assembly, perform “flatsat” testing with everything wired on a bench. This is also when you should verify communications with the spacecraft via its radios.
+ Once assembled, put the CubeSat through vibration and thermal vacuum testing to ensure that it will survive the stresses of launch and the space environment.
+ Finally, obtain the required certifications for earth observation, radio licenses, and an approved deorbit plan. NASA has a helpful guide for first-time CubeSat developers with instructions and templates, and also a state-of-the-art technology report.
(This overview is incomplete—please do not base your spacecraft design on an email newsletter.)

[ANS thanks The Orbital Index for the above information]

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the URLs for these files. All Celestrak websites are now at celestrak.org -- celestrak.com will no longer work.

There was a problem with the format of the nasa.all version of the TLEs last week. The nasabare.txt file was unaffected by this problem, and the issue appears to have been resolved in this week's file.

[ANS thanks Ray Hoad, WA5QGD, AMSAT Orbital Elements Manager, for the above information]

ARISS NEWS

Amateurs and others around the world may listen in on contacts between amateurs operating in schools and allowing students to interact with astronauts and cosmonauts aboard the International Space Station. The downlink frequency on which to listen is 145.800 MHz worldwide.

Recently completed: Hospital School Program in partnership with Seacrest Studios at Monroe Carell Jr. Children’s Hospital at Vanderbilt, Nashville, Tenn., direct via N4FR. The ISS callsign was NA1SS, and the crewmember was Kjell Lindgren, KO5MOS. Contact was successful on Wednesday, 2022-08-24 17:42:54 UTC with 27 degrees elevation. Congratulations to the Monroe Carell Jr. Children’s Hospital at Vanderbilt students and Kjell!

Current ARISS operations include voice repeater transmissions with the JVC Kenwood D710GA in the Columbus module and APRS packet operation from an identical radio in the Service Module (Zvezda). Packet operations are on 145.825 MHz.

Kjell Lindgren, KO5MOS, continues to be making general contacts on the cross-band repeater. He is using NA1SS. If any crewmember is so inclined, all they have to do is pick up the microphone, raise the volume up, and talk on the crossband repeater. So give a listen, you just never know.

The latest information on the operation mode can be found at https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

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CN84

N8AJM: From September 12 to 16 I hope to be in EM85. I will be working FM only with no set schedule. I may also activate a few grids on the way down from EN72. I will try to post all passes on hams.at

KJ7DZ: CN74 roving trip booked. Sept 22 – 24. More info will be posted as time gets closer

KI7QEK: I'm taking a family vacation in British Columbia and Alberta from August 27-September 3, and planning to bring FM and linear gear. "Holiday style" so no promises on passes, but I will be passing through these grids: DN09, DO00, DO01, DO11, DO20 & DO21

9Y60, TRINIDAD AND TOBAGO (Special Event): Members of the Trinidad and Tobago Amateur Radio Society (TTARS) will be active as 9Y60TT to celebrate Trinidad and Tobago's 60th anniversary of independence (August 31st, 1962) between August 26th and September 2nd. Activity will be on the HF/VHF bands using CW, SSB, Slow Scan TV (SSTV), Digital Modes (FT8/ FT4, JS8, JT65, 2m EME (Moonbounce), Satellite, APRS via ISS, Digital Voice (DMR, C4FM, D-Star), EchoLink….and more. QSL via LoTW, ClubLog and QRZ.com. For more details and info on how to obtain a certificate, see: 9y60tt [dot] info (received from JoAnne Maenpaa by email)

[ANS thanks Paul Overn, KE0PBR, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

2022 HamXposition, and ARRL New England and Hudson Division Convention (hamxposition.org)
Saturday and Sunday August 27 and 28, Marlborough, MA (Flea Market and some classes and workshops on Friday)
AMSAT will have a booth with info, demos, and items for sale.
Burns Fisher, WB1FJ will be presenting "What's New At AMSAT"

41st ARRL and TAPR Digital Communications Conference (DCC)
September 16–18, 2022
Hilton Charlotte Airport Hotel
Charlotte, North Carolina
https://tapr.org

2022 Rocky Mountain ARRL Division Convention
Friday, October 7th, 2022 to Sunday, October 9th, 2022
Event Center at Archer
3921 Archer Pkwy
Cheyenne, Wyoming 82007
https://wyhamcon.org/site

2022 AMSAT-UK International Space Colloquium
October 8–9, 2022
Kents Hill Park Conference Centre, Milton Keynes
https://rsgb.org/main/about-us/rsgb-convention/

40th Annual AMSAT Space Symposium and General Meeting
October 21–22, 2022
The Crowne Plaza Suites, 3 Appletree Square, Bloomington, MN
https://launch.amsat.org/event-4922878

[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, for the above information]

Satellite Shorts From All Over

+ Congratulations to John Langille, VE1CWJ, in FN85 and Philippe Chateau, EA4NF, in IN80 on a new distance record on XW-2A of 4,751 km - an astounding distance given XW-2A's apogee is now just 405 km! All current satellite distance records may be viewed at https://www.amsat.org/satellite-distance-records/ (ANS thanks Paul Stoetzer, N8HM, AMSAT Executive VP, for the above information)

+ An amazing video that shows how the Starlink antenna works is available at https://www.youtube.com/watch?v=qs2QcycggWU (ANS thanks Mike Hoblinski, N6IMF, for the above information)

+ A SpaceX Dragon supply freighter undocked from the International Space Station on August 19, heading for splashdown off the coast of Florida Saturday with about two tons of cargo, experiments, and a leaky spacesuit. The unpiloted cargo carrier will bring home a spacesuit worn by European astronaut Matthias Maurer in March, when the station crew noticed water leaking in Maurer’s helmet after he returned to the lab’s pressurized airlock. NASA has suspended use of U.S. spacesuits for non-emergency spacewalks until the suit is returned to Earth for inspection and analysis. (ANS thanks Spaceflight Now for the above information)

+ Cosmonaut Oleg Artemyev’s spacewalk was cut short by a suit battery issue on August 17. With NASA’s suits grounded at the moment, the ISS is running out of EVA options. (ANS thanks The Orbital Index for the above information)

+ As World Radio Conference 2023 (WRC23) gets closer so the preparatory activities for all the agenda items are increasing in intensity. The most pressing for the amateur community is the 23cm band radio navigation satellite service (RNSS) coexistence agenda item 9.1b. The IARU engagement is continuing with the studies in the regulatory institutions as well as amongst the amateur community. As detailed proposals are starting to emerge so the amateur community needs to be ready to defend its interests in this band. See https://www.iaru-r1.org/ for more information. (ANS thanks Barry Lewis, G4SJH, for the above information)

+ MANY THANKS to Steve Kenwolf, WH6BSZ, for creating the new logo for the AMSAT News Service! We appreciate Steve's work and creativity in updating our look on the web and social media versions of ANS. (ANS thanks Mark Johns, K0JM, AMSAT News Service Senior Editor, for the above information.

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Mark Johns, K0JM
k0jm at amsat dot org